BIRMINGHAM COAL & COKE CO., INC.
GOODEN CREEK NO. 2 MINE P-3979
ATTACHMENT III-E

HYDROLOGIC MONITORING PLAN

COMPANY NAME: BIRMINGHAM COAL & COKE CO., INC.
MINE NAME: GOODEN CREEK NO. 2 MINE COUNTY: MARION & WALKER
***A MAP SHOWING ALL MONITORING POINTS MUST ACCOMPANY THIS PLAN**

I. Surface Water Monitoring Program: (Discharge Points)

Discharge points will consist of Sediment Basins 020, 021, 022, 023, 024, 027, 028, 029, 030, 031, 033, 034, 037, 038, 042, 044, 046, 052, 053, 054, 055, 056, 057, 161, 187 and 188. Grab Samples will be taken from the primary spillway systems. The duration of monitoring will be until joint approved by ASMC and ADEM and in no case sooner than ASMC approval of Phase II Bond release. The following table presents "Active Mining Limitations and Monitoring Requirements". See ADEM permit for footnote explanations.

Parameter	Discharge Limitations			Monitoring Requirements	
	Daily Minimum	Monthly Average	Daily Maximum	Sample Type	Measurement Frequency[1]
Specific Conductance 00095	-------	Report µS/cm	Report µS/cm	Grab	2/Month
Sulfate (As S) 00154	-------	Report mg/L	Report mg/L	Grab	2/Month
pH 00400	6.0 s.u.	-------	9.0 s.u.	Grab	2/Month
pH[2] 00400	6.0 s.u.	-------	10.5 s.u.	Grab	2/Month
Solids, Total Suspended 00530	-------	35.0 mg/L	70.0 mg/L	Grab	2/Month
Iron, Total (As Fe) 01045	-------	3.0 mg/L	6.0 mg/L	Grab	2/Month
Manganese, Total (As Mn)[3] 01055	-------	2.0 mg/L	4.0 mg/L	Grab	2/Month
Flow, In Conduit or Thru Treatment Plant[4] 50050	-------	Report MGD	Report MGD	Instantaneous	2/Month
Toxicity, Ceriodaphnia Acute[5] 61425	-------	-------	0 pass(0)/fail(1)	Grab	1/Quarter
Toxicity, Pimephales Acute[5] 61427	-------	-------	0 pass(0)/fail(1)	Grab	1/Quarter
Solids, Total Dissolved (TDS) 70296	-------	Report mg/L	Report mg/L	Grab	1/Quarter

1 See Part I.C.2. for further measurement frequency requirements.
2 See Part IV.E. for pH Exemption Discharge Limitations.
3 See Part IV.F. for Manganese Exemption Discharge Limitations.
4 Flow must be determined at the time of sample collection by direct measurement, calculation, or other method acceptable to the Department.
5 See Part IV.G. for Effluent Toxicity Limitations and Biomonitoring Requirements for Acute Toxicity.

Precipitation Exemption Limitations and Monitoring Requirements

During periods of applicable 24-hour precipitation events* for which the Permittee claims an exemption such discharge shall be limited and monitored by the Permittee as specified below:

Parameter	Discharge Limitations			Monitoring Requirements	
	Daily Minimum	Monthly Average	Daily Maximum	Sample Type	Measurement Frequency[7]
Specific Conductance 00095	-------	Report µS/cm	Report µS/cm	Grab	2/Month
Sulfate (As S) 00154	-------	Report mg/L	Report mg/L	Grab	2/Month
pH 00400	6.0 s.u.	-------	9.0 s.u.	Grab	2/Month
Solids, Settleable[8] 00545	-------	-------	0.5 mL/L	Grab	2/Month
Iron, Total (As Fe) [9] 01045	-------	-------	7.0 mg/L	Grab	2/Month
Flow, In Conduit or Thru Treatment Plant[10] 50050	-------	Report MGD	Report MGD	Instantaneous	2/Month
Solids, Total Dissolved (TDS) 70296	-------	Report mg/L	Report mg/L	Grab	1/Quarter

*Applicable 24-hour precipitation events include those that are greater than 1-year, 24-hour precipitation events or less than, equal to, or greater than 2-year, 24-hour precipitation events, and 10-year, 24-hour precipitation events.

A. Reporting and Recording Specifications:

a) NPDES outfalls:

Reporting as required for NPDES permit to Alabama Department of Environmental Management plus a simultaneous copy to ASMC containing the following:

1) Name of Company
2) Name of Mine
3) ASMC permit number
4) NPDES number
5) Sampling period covered by report
6) List of the discharge points sampled and analysis results

b) Other:

B. Non-Compliant Discharge Reporting:

Reporting as required by the NPDES permit to Alabama Department of Environmental Management plus simultaneous copy (indicating ASMC permit number) to ASMC.

II. Other Surface Water Monitoring.

Bodies of water receiving discharges from the mine:

List Monitoring Points and indicate type or describe location	List Parameters to be sampled	Frequency Minimum Quarterly	Duration of Monitoring
BCGCSW-2 (Goodwin Creek downstream)	pH TSS FeT MnT Discharge	Quarterly	For Life of Mine
SW-3 (U.T. to Gooden Creek upstream)	pH TSS FeT MnT Discharge	Quarterly	For Life of Mine
SW-4 (Gooden Creek upstream & downstream)	pH TSS FeT MnT Discharge	Quarterly	For Life of Mine
SW-5 (Goodwin Creek upstream)	pH TSS FeT MnT Discharge	Quarterly	For Life of Mine
SW-6 (U.T. to Goodwin Creek upstream)	pH TSS FeT MnT Discharge	Quarterly	For Life of Mine

II. Other Surface Water Monitoring (Continued)

Sampling, analysis and reporting will be done Quarterly:

- Aluminum (Al) – total (mg/L)
- Antimony (Sb) – total (mg/L)
- *Arsenic (As) – total (mg/L)
- Beryllium (Be) – total (mg/L)
- Cadmium (Cd) – total (mg/L)
- Chromium (Cr) –total (mg/L)
- Copper (Cu) –total (mg/L)
- Mercury (Hg) – total (mg/L)
- Nickel (Ni) – total (mg/L)
- Selenium (Se) – total (mg/L)
- Silver (Ag) – total (mg/L)
- Thallium (Tl) – total (mg/L)
- Zinc (Zn) – total (mg/L)

Analytical techniques must comply with methods approved by both the EPA and by the *Standard Methods for Examination of Water & Wastewater*. This includes EPA method 200.8 (Standard Method 3125B-2009, Inductively Coupled Plasma Mass Spectrometry) for all metals except mercury.

Standards and techniques for the examination of mercury must comply with EPA 245.1 (Standard Method 3112B-2009, cold vapor manual).

* If arsenic is detected, arsenic speciation must be conducted.

A. Reporting and Recording Specifications:

1) Frequency of Reporting: Quarterly

2) Contents of Report: Name of company, mine name, ASMC permit number and for all monitoring locations, the dates samples were taken and sample results for each parameter and who collected and analyzed the samples.

III. Monitoring requirements for removal of sediment ponds and other treatment facilities:

One sample of inflow within 48 hours of a 24 hour precipitation event prior to application for approval to remove facility. Monitoring data will be submitted to ASMC with application to remove the facility.

Monitoring sites shall be located to sample water entering the facility. (i.e., untreated drainage).

Show proposed locations on the monitoring location map. Parameters to be sampled shall be pH and settleable solids.

IV.

A. Monitoring requirements for Phase II bond release:

List each discharge point to be monitored and indicate the type or source of discharge	List parameters to be sampled for each discharge point	List frequency of sampling for each discharge point	Duration of Monitoring
Inflow into the following basins: 020P, 021P, 022P, 023P, 024P, 027P, 028P, 029P, 030P, 031P, 033P, 034P, 037P, 038P, 042P, 044P, 046P, 052P, 053P, 054P, 055P, 056P, 057P, 161P, 187P and 188P.	pH Iron (Fe) Total Suspended Solids (TSS) Manganese (Mn)	Monthly	No less than monthly for previous 6 months prior to application for Phase II Bond release.
If no flow to basins during 6 month period:	Same as above.		In pond Sample
Inflow to basins:	pH settleable solids		1 sample prior to sediment Basin Removal Design Plans

Inflow sample will be taken within 48 hours after commencement of a 24 hour precipitation event.
If the basin has not discharged during the 6 month period, an in pond sample will be taken.

B. Reporting:

Reports shall be submitted with application for Phase II Bond Release indicating: Sample location number, monitoring period, analysis results, date for each sample, sampling and analytical data and a map showing location of the sample sites.

V. Groundwater Monitoring

List Monitoring Points and indicate type or describe location	List Parameters to be sampled	Frequency Minimum Quarterly	Duration of Monitoring
OB/MW-1 OB/MW-2	pH Iron (Fe) Manganese (Mn) Water Level Sulfates	Quarterly	Life of Mine

If any of the wells listed above are destroyed or mined through, it (or they) will be re-drilled at its (their) approximate original location(s) and will be drilled to the approximate same depth as the original well(s). Replacement of the well(s) will be conducted in a manner which will not interrupt the quarterly monitoring of these groundwater sites. The well casing(s) will be installed in such a manner as to prevent surficial contamination. A lithologic log of the re-drilled well(s), along with casing specifications, will be submitted to the Regulatory Authority with the first post-restoration sample.
If, according to the results of the PHC, it is determined that groundwater monitoring may not be necessary, the applicant shall submit with the permit application sufficient documentation, including geologic and hydrologic relations, to enable the Commission to make a decision regarding a waiver of the monitoring of the groundwater.

A. Reporting and Recording:

Reports to be filed with ASMC quarterly supplying the following information: Company name, mine name, permit number, and for each monitoring site, the date and sample results for each parameter, including sampling and analytical information for all samples.

VI. Maintenance of records and Availability for Inspection:

a) Active Mining - copies of all monitoring records shall be maintained at office.

b) During periods of temporary cessation of operations and after active mining, all monitoring records will be kept at:

BIRMINGHAM COAL & COKE CO., INC. (Office)

912 EDENTON STREET (Address)

BIRMINGHAM, AL 35242 (City & State)

ROBERT A. LEWIS (Custodian of Records)

c) All monitoring records will be made available upon request to ASMC Personnel for inspection.

VII. Describe how the data obtained from performance monitoring may be used to determine the impacts of the operation upon the hydrologic balance. Describe how parameters to be monitored relate to the suitability of the surface and ground water for current and approved post mining land use.

The performance monitoring as described above will provide an excellent gauge for determining most alterations in the hydrologic balance that are caused by this mining operation.

Surface water-monitoring sites BCGCSW-2 and SW-4 are located downstream of mining while SW-3, SW-5 and SW-6 are located upstream of any mining to be conducted by BIRMINGHAM COAL & COKE CO., INC. Results of the analysis from the pre-mine analysis of these stations can be compared to the post mining results during mining to determine the impact to the receiving stream once mining begins. Monitoring Well OB/MW-1 and OB/MW-2 will monitor the characteristics of the groundwater within the permit area. This site can be compared to the results of the analysis from baseline sampling to determine the impact to the groundwater and be compared to predictions made in the PHC.

No other parameters are deemed necessary at this time. However, if, during the course of the mining operation, it is determined through the performance monitoring that problems exist, additional parameters may be monitored and the hydrologic monitoring plan will be revised (in consultation with ASMC) to reflect such changes.

VIII. Please NOTE: ALL PERFORMANCE MONITORING REPORTS should be submitted in duplicate. For companies with multiple permits, each permit should have a corresponding monitoring report. Sites serving multiple permits should be included in all pertinent monitoring reports.

IX. If a waiver is requested for a particular water-bearing stratum, give details. 880-X-8H.06 (1) (h) (2)

I. Plans For Recording and Reporting Data (779.13)

Describe how surface and groundwater quantity and quality will be collected, recorded, and reported to the Regulatory Authority according to Section 816.52.

All samples shall be taken according to Standard Methods 1060 and "Collection and Preservation of Samples" or other equally valid approved methods.

Surface water samples shall be taken by the "grab" method.

Flowrate measurement of surface water samples shall be according to ASTM D3858 "Standard Practice for Open Channel Flow Measurement of Water by Velocity - Area Method" or other equally valid approved methods.

All surface water samples were taken by the grab method. Flow rate measurements of surface water samples were performed in accordance with ASTM D3858, 10.9.6, p.101 "Standard Practice for Open Channel Flow Measurement of Water by Velocity - Area Method". Specific Conductivity and pH of all samples were measured in the field. The samples were poured in a clean plastic container and stored at a temperature near 4^{o}C and all other parameters were analyzed within 24 hours. If samples were not analyzed within 24 hours, after the pH was measured, the pH was adjusted to 2.0 S.U. or less with Nitric Acid (about 2 mL per liter) which allows samples to be stored up to six months at room temperature. Prior to analyzing other parameters, the pH was re-adjusted to between 4.0 and 5.0 S.U. with 0.1N Sodium Hydroxide. Samples for TSS and sulfates that were not run within 24 hours were refrigerated near 4^{o}C and TSS analyzed within 7 days and sulfates within 28 days. Sample preservation if used was in accordance with Table 1060:I (Summary of Special Sampling or Handling Requirements) from Standard Methods for the Examination of Water and Wastewater 17th Edition 1989 (page1-37).

Groundwater samples shall be taken by the “grab” method.

The quantity of the water will be determined by comparing the depth to the bottom of the well and depth to the water.

The sampling methods for pH, Fe, Mn and SO_4 are to be sampled in accordance to Hach Water Analysis Handbook. These methods are EPA approved and are adapted from Standard Methods for the Examination of Water and Wastewater.

Sampling will be recorded and reported to the Regulatory Authority as outlined in Part III-D & E of this application.